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SMART RESTAURANT MENU ORDERING SYSTEM USING ARDUINO UNO

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ABSTRACT

Nowadays automation systems are everywhere whether its home, office or any big industry, all are equipped with automation systems. Foods providing shops such as Restaurants, Hotels and cafeterias are also using and updating their shops with automation trends and installing robots to serve food and beverages for customers to taking orders. Using this type of technologies like digital menu leads the customers can easily choose the items and make the shop as attractive to customers. This menu lists will be sent to the respective chefs of the Restaurant as digitalized display. We want to construct an advanced Restaurant as smart and innovative using 433MHz RF transmitter/receiver module, Arduino and TFT display. The transmitter section having the TFT display, Arduino Uno, and an RF transmitter, by using these circuit customers can able to choose the food items and place the order. Whereas the receiver side has an LCD module, RF receiver, Arduino Uno and a Buzzer, by installing these circuit in the restaurant the chef can able to track the order and start making the respective items.

Keywords: *Allergic, Customized menus, Pen-paper method, Tablet-type devices, etc.*

I. INTRODUCTION

We always enjoy going to restaurant to taste the food where there is a quality of service provided is much essential to serve the customers. But sometimes there is a delay and exchange of dishes unknowingly in the service makes the customers get irritated. Because of the number of tables and crowd handling pressure. So, we want to overcome these issues by implement the smart restaurant menu ordering system which is directly connected to the customer and the hotel's chef and the order will be placed directly to kitchen.

In our system is divided into two parts - the Transmitter Section and the Receiver section. The transmitter which will transmit the data given by the customers which includes the food items ordered and in the kitchen the chef will receive the order. Hence, the food will be prepared quickly without wastage of time and it is environment friendly. The transmitter section will consist of Arduino UNO, TFT display and also an RF transmitter in which the customer can select the food items and can place the order and the receiver section having an LCD module, RF receiver, Arduino UNO, and a Buzzer which can be installed in the kitchen to track the orders. So, by using this order can be placed directly from the customers' table to the restaurant kitchen.

Earlier there were various systems of smart restaurant which included using of Zig-bee technology, QR Scanner code technique, using Raspberry pie, virtual hotel concept. But all this required highly skilled labours, source of income and setup. So, our Arduino set-up is user friendly as it is easily configurable and even average learned person can operate it.

II. SCOPE

The advancement of technology, people are used to the touchscreen interface these days. The customer can easily navigate by touching the screen before them. With slight change in this project, this system can be widely used in various places such as cafeterias, pubs, canteens and theatres too. Some of the points to be noted for scope are: (1) Customizable Integration and Smooth Operation of Restaurants there the digital system makes sure of the smooth operation going from the customer to the kitchen and keeps the operation efficient using minimal time-frame for transmission of orders and messages. Fast customer support is vital for a system in case. With this system, the operators have freedom of creating order menu, design changes and other functional changes to the system. (2) Automation in Food Service Industry: With the aim of reduction of resources and scalability, this system is introduced. This system is highly scalable and can support maximum, numbers of customers with minimal resources used. It also highly improves the kitchen efficiency with less interruption and can be a highly reliable investment both operationally and financially.

III. COMPONENTS NEEDED

1) 433MHz RF Transmitter & Receiver
2) 2.4" TFT LCD Touch shield
3) 16*2 LCD Module
4) I2C Module
5) Arduino Uno (2)

3.1. RF TRANSMITTER AND RECEIVER MODULE

Wireless systems must operate within a certain distance, and they must transmit a certain amount of information at a certain data rate. The RF module is small and has a wide operating voltage range from 3V to 12V. RF modules are 433 MHz RF transmitter and receiver modules. The transmitter draws no power when transmitting logic zero while fully suppressing the carrier frequency thus consume significantly low power in battery operation. When the logic 1 is sent to the carrier it has 3Vpower supply with a 4.5mA. The data is sent one by one from the transmitter, which is received by the configured receiver the transmitter and receiver are attached to the two microcontrollers to transmit data.

3.2. 2.4” TFT LCD MODULE

2.4" TFT LCD module is a multicoloured touch shield Arduino UNO/ Mega compatible TFT display that having SD card socket. This TFT display module has a bright backlight and a colourful 240X320 pixels display. It also having the separate RGB pixel control which gives better resolution than the black and white displays.

3.3. 16x2 LCD MODULE

The LCD modules are generally used in various embedded projects because of its cost, Programmer friendly and availableness. It has 2X16 rows and columns. There are such combinations like 8×1, 8×2, 10×2 and 16×1 etc., but commonly 16×2 LCD module is used. It has 32 characters (ie.16×2=32) in total and each has 5×8 Pixel dots. It has operated in between 4.7V to 5.3V of voltage and 1mA is current required without using the backlight. It also can be operated on both 4-bit and 8-bit mode.

3.4. I2C MODULE

For displaying received data on LCD module we have used I2C module. I2C Module has an inbuilt PCF8574 I2C chip that converts I2C serial data into parallel data for the displaying on the LCD. These modules are currently supplied with a default I2C address of 0x3F or0x27. This module also helps to adjust the potentiometer Backlight and Contrast.

3.5. ARDUINO UNO

It is a Microcontroller Board which is based on 8-bit ATmega328P microcontroller. Along with ATmega328P, it comprises other components such as voltage regulator, serial communication, crystal oscillator etc. to assist the microcontroller. Arduino UNO consist of 14 digital input-output pins where, 6 pins of them can be used as analogue input pins and another 6 pins of them are used as PWM outputs, a USB connection, a Reset button, Power Barrel Jack and ICSP header. Arduino board can be used to communicate with another Arduino board, a computer or other microcontrollers. Using the digital pin 0 and digital pin 1, the ATmega-328P microcontroller delivers UART TTL (5V) serial communication. (i.e.) Rx and Tx.

IV. WORKING AND METHODOLOGY

Smart Restaurant Menu Ordering System includes RF Transmitter and Receiver sections. Both the transmitter and receiver phase use the Arduino UNO for data processing.

4.1. TRANSMITTER SECTION

The transmitter phase of this task includes an Arduino Uno, RF Transmitter, and TFT display shield. This phase is used for ordering from the menu this is proven at the TFT show. Arduino Uno is the main part of the transmitter phase that process all the data, and the RF transmitter module is used to transmit the chosen data to the receiver. The data pin of the RF transmitter module is attached to digital pin 12 of Arduino even as VCC and GND pins are attached to 5V and GND pin of Arduino. As proven in circuit the data pin of the RF transmitter module is attached to display pin 12 of Arduino GND even as and VCC pins are related to GND and 5V pin of Arduino respectively.

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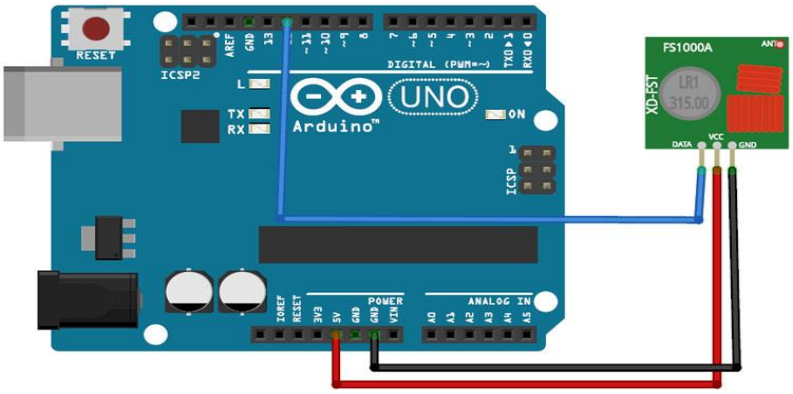

Figure 1: Transmitter circuit diagram

After efficiently executing simulation, transmitter gives menu listing like meals, tea, ice-creams and so on stuffs to the respective chef and after the chefs gets lists of items with table id by means of RF transmitter module to RF receiver module on the shop's kitchen.

4.2. RECEIVER SECTION

The receiver phase of this task has an Arduino Uno, RF Receiver, 16*2 LCD module, and I2C module. RF receiver is used to acquire the information from the transmitter phase, and the LCD module is used to show the acquired information.

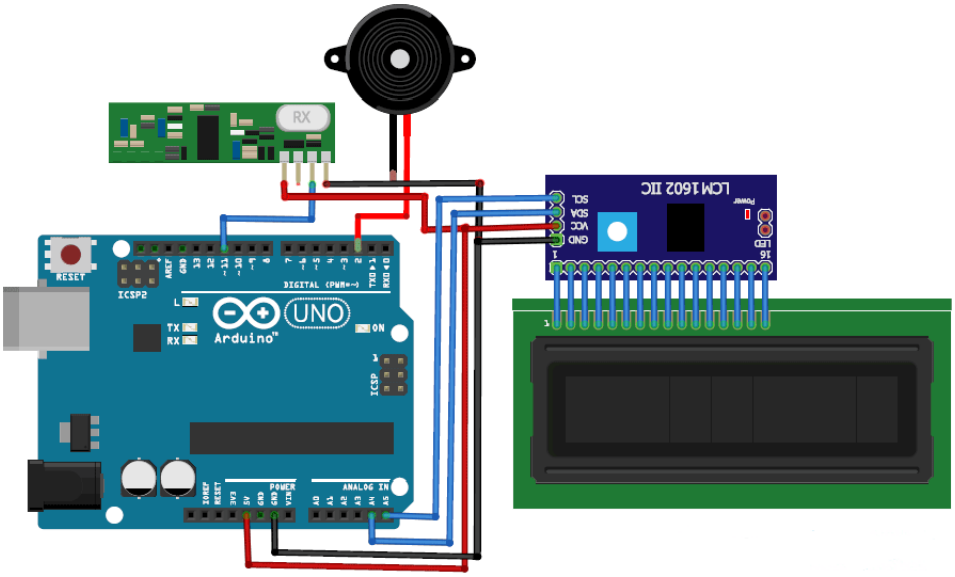

Figure 2: Receiver circuit diagram

A buzzer is used to make a valid on every occasion of new order is placed. The data pin of the RF receiver is attached to digital pin 11 of Arduino even as VCC and GND pin is attached to the 5V and GND pin of Arduino. The positive pin of Buzzer is attached to the Arduino digital pin 2, and the negative pin is attached to the Arduino GND pin. SCL and SDA pins of the I2C module is attached to analogue pins A5 & A4 of Arduino even as VCC and GND pins are related to 5V and GND pins of Arduino. After efficiently getting transmitted module

to the receiver side, the chef will make the menu list of the respective tables and thereby the food is provided to the customer with certain table identification menu ordering items.

V. RESULTS

After connecting all the hardware as shown in fig (3) and fig (4) and uploading the code for both the transmitter and receiver section, now it's time to test the project. To test the project, press a button on the TFT display, it should display the dish name with table number that is T1 on the LCD module connected to the receiver side. If the receiver side LCD doesn't display anything, then check whether your TFT screen is working or not. Thereby the system will get the simulation.

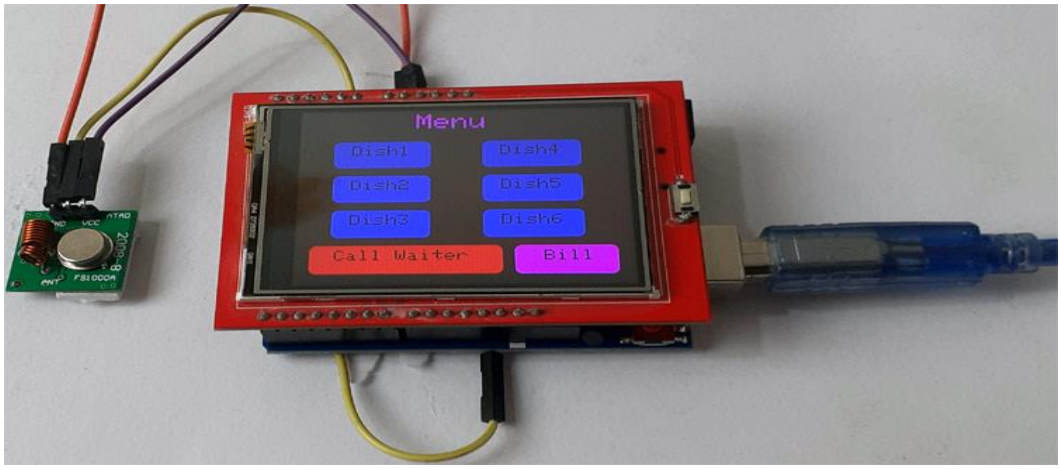

Figure 3: Implementation of hardware in transmitter side

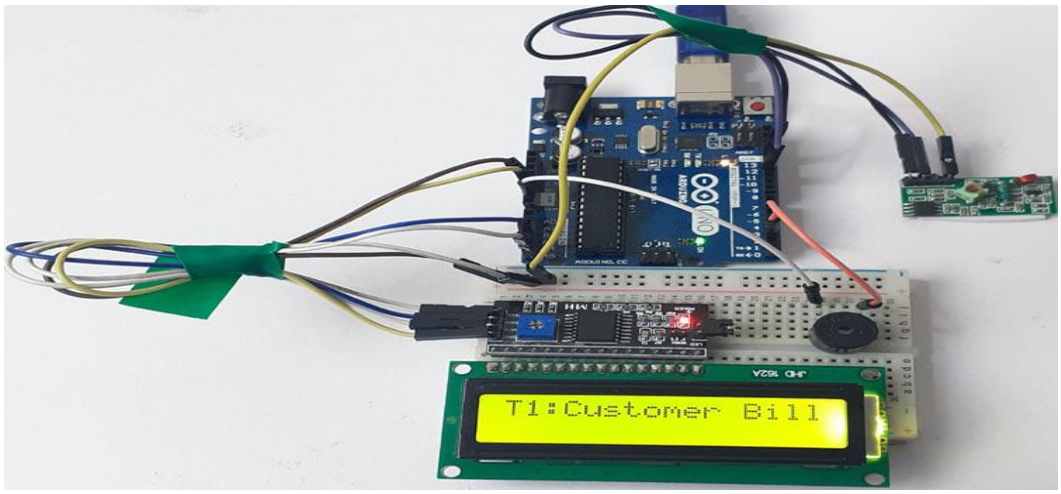

Figure 4: Implementation of hardware in receiver side

VI. CONCLUSION

In this Automatic Menu and Ordering system, we have developed an interactive, user-friendly food ordering system with digital menu for food service industry. This System prioritizes the basic constraints of any food service industry which are time, hospitality and hassle-free service system. This gadget eases customers to

reserve with the aid of using touching the floor of a virtual menu this is domestically related to the kitchen with an RF module. This System will help them to properly manage the meals of the customers, reduce the kitchen time, also can be used to reduce delays and errors caused by waiters on orders of customers. So, using this system will help in reducing the labour and provide more facility for Customer to like the services of the restaurants. This is a practical, powerful, economic and flexible system that can increase the overall productivity of food service industry.

This system is made to provide pleasant service and customer satisfaction. It will definitely surpass people's dining style and habits. This can bring in more revenue for restaurants while allowing customers to better understand what kind of food they want to have, and give them a top-notch interactive experience.

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